

AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111

Serial Number: 09/702068

Filing Date: October 30, 2000

Title: Enzymatic Treatment of Whey Proteins for the Production of Antihypertensive Peptides and the Resulting Products

Page 3
Dkt: 267.011US1IN THE CLAIMS

Please amend the claims as follows:

C2

1. (Previously Presented) A process for preparing an angiotensin-converting enzyme (ACE)-inhibiting composition comprising:
preparing an aqueous solution of a whey protein fraction and a proteolytic enzyme,
wherein the proteolytic enzyme is trypsin,
holding said solution under conditions effective for reaction to partially hydrolyze said whey protein fraction to provide a hydrolysate having increased ACE-inhibiting activity,
stopping the reaction; and
drying said hydrolysate.

5/11 102

2. (Original) A process according to claim 1 wherein the proteolytic enzyme is inactivated.

3. (Original) A process according to claim 1 wherein the proteolytic enzyme is inactivated by heating following hydrolysis.

102

4. (Canceled).

5. (Currently Amended) A whey protein hydrolysate An ACE-inhibiting composition as prepared according to claim 1.

6. (Currently Amended) A treatment regimen for a mammal to inhibit angiotensin-converting enzyme (ACE), said regimen comprising:
orally administering to the mammal, a the composition product prepared according to claim 1, 12, or 13 of claim 5 or 32 in amounts and at intervals effective to inhibit ACE activity.

102

AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111

Page 4
Dkt: 267.011US1

Serial Number: 09/702068

Filing Date: October 30, 2000

Title: Enzymatic Treatment of Whey Proteins for the Production of Antihypertensive Peptides and the Resulting Products

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7. (Previously Presented) A process according to claim 1, wherein said hydrolysate is characterized by the following Molecular Weight Profile (HPLC)

| Range (Daltons) | Soluble Peptides |
|-----------------|------------------|
| > 5000 | 50 - 55% |
| 2000 - 5000 | 15 - 20% |
| < 2000 | 30 - 35%. |

8. (Previously Presented) A process according to claim 1, wherein said whey protein fraction is a whey protein isolate.

9. (Previously Presented) A process according to claim 1, wherein said reaction is stopped when the degree of hydrolysis is within the range of from 5.5 to 6.5%.

10. (Previously Presented) A process according to claim 1, wherein said whey protein fraction is produced by ion exchange and characterized by a protein content of at least 94% and an ash content of less than 3%.

11. (Previously Presented) A process according to claim 10, wherein said reaction is stopped when the degree of hydrolysis is within the range of from 5.5 to 6.5%.

12. (Previously Presented) A process for preparing an angiotensin-converting enzyme (ACE)-inhibiting composition comprising:

preparing an aqueous solution of a whey protein fraction produced by ion exchange and a proteolytic enzyme, wherein the proteolytic enzyme is trypsin;

holding said solution under conditions effective for reaction to partially hydrolyze said whey protein fraction to provide a hydrolysate having increased ACE-inhibiting activity;

AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111

Serial Number: 09702068

Filing Date: October 30, 2000

Title: Enzymatic Treatment of Whey Proteins for the Production of Antihypertensive Peptides and the Resulting Products

Page 5

Dkt 267.011US1

*Cont
C2*

stopping the reaction when a degree of hydrolysis is reached within the range of from 5.5 to 6.5%, wherein said hydrolysate is characterized by the following Molecular Weight Profile (HPLC)

| Range (Daltons) | Soluble Peptides |
|-----------------|------------------|
| > 5000 | 50 - 55% |
| 2000 - 5000 | 15 - 20% |
| < 2000 | 30 - 35%; and |

drying said hydrolysate.

13. (Currently Amended) A process for preparing an angiotensin-converting enzyme (ACE)-inhibiting composition comprising:

a) preparing an aqueous solution of a whey protein fraction, prepared by ion exchange processing and characterized by a protein content of at least 94% and an ash content of less than 3%, and a proteolytic enzyme, wherein the proteolytic enzyme is trypsin; and

b) holding said aqueous solution under conditions effective for reaction to partially hydrolyze said whey protein fraction to provide a hydrolysate having increased ACE inhibiting activity;

c) stopping said reaction to provide a hydrolysate solution; and

d) drying said hydrolysate solution prepared in step c to provide the ACE-inhibiting composition.

AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111

Serial Number: 09/702068

Filing Date: October 30, 2000

Title: Enzymatic Treatment of Whey Proteins for the Production of Antihypertensive Peptides and the Resulting Products

Page 6

Dkt: 267.011US1

*Cont
C2*

14. (Previously Presented) A process according to claim 13, wherein said hydrolysate is characterized by the following Molecular Weight Profile (HPLC)

| Range (Daltons) | Soluble Peptides |
|-----------------|------------------|
| > 5000 | 50 - 55% |
| 2000 - 5000 | 15 - 20% |
| < 2000 | 30 - 35%. |

15. (Currently Amended) A process according to claim 13-14, wherein said reaction is stopped when the degree of hydrolysis is within the range of from 5.5 to 6.5%.

16. (Previously Presented) A process according to claim 1 or 12, wherein the whey protein fraction has an ash content of <3%.

17. (Previously Presented) A process according to claim 1, 12, or 13, wherein the whey protein fraction has a mineral content of calcium of 15-20 meq/kg.

18. (Previously Presented) A process according to claim 1, 12, or 13, wherein the whey protein fraction has a mineral content of magnesium of <1 meq/kg.

19. (Previously Presented) A process according to claim 1 or 12, wherein the whey protein fraction has a protein content of at least 35%.

20. (Previously Presented) A process according to claim 1 or 12, wherein the whey protein fraction has a protein content that varies by 0 to 25% from 97.5 ± 1.0%.

21. (Previously Presented) A process according to claim 1 or 12, wherein the whey protein fraction has a protein content that varies by 5 to 10% from 97.5 ± 1.0%.

AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111

Serial Number: 09/702068

Filing Date: October 30, 2000

Title: Enzymatic Treatment of Whey Proteins for the Production of Antihypertensive Peptides and the Resulting ProductsPage 7
Dkt: 267.011US1

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22. (Previously Presented) A process according to claim 1, 12, or 13, wherein the whey protein fraction has a protein content that varies less than 5% from $97.5 \pm 1.0\%$.

23. (Previously Presented) A process according to claim 1, 12, or 13, wherein the whey protein fraction has a protein content of $97.5 \pm 1.0\%$.

24. (Previously Presented) A process according to claim 1, 12, or 13, wherein the whey protein fraction is characterized as follows:

| Analysis | Specification | Typical Range |
|-------------------------------------|---------------|----------------|
| Moisture (%) | 5.0 max | 4.7 ± 0.2 |
| Protein, dry basis (N x 6.38)(%) | 95.0 min. | 97.5 ± 1.0 |
| Fat (%) | 1.0 max | 0.6 ± 0.2 |
| Ash (%) | 3.0 max | 1.7 ± 0.3 |
| Lactose (%) | 1.0 max | <0.5 |
| pH | 6.7 - 7.5 | 7.0 ± 0.2 |

25. (Previously Presented) A process according to claim 12 or 13, wherein the whey protein fraction is a whey protein isolate.

26. (Previously Presented) A process according to claim 1, 12, or 13, wherein the proteolytic enzyme is porcine trypsin.

27. (Previously Presented) A process according to claim 1, 12, or 13, further comprising concentrating said hydrolysate.

AMENDMENT AND RESPONSE UNDER 37 CFR § 1.111

Serial Number: 09/702068

Filing Date: October 30, 2000

Title: Enzymatic Treatment of Whey Proteins for the Production of Antihypertensive Peptides and the Resulting Products

Page 8

Dkt: 267.011US1

Cont
C2

28. (Previously Presented) A process according to claim 1 or 12, wherein the hydrolysate is spray-dried.

29. (Previously Presented) A process according to claim 1, wherein the whey protein fraction is prepared by ion-exchange processing.

30. (Previously Presented) A process according to claim 1, wherein said reaction is stopped when the degree of hydrolysis is within the range of from 11.0-12.5%.

31. (Previously Presented) A process according to claim 1, wherein said reaction is stopped when the degree of hydrolysis is within the range of from 19.5-20.5%.

32. (Currently Amended) A whey protein hydrolysate An ACE-inhibiting composition as prepared according to claim 12 or 13.

33. (New) A process for preparing an angiotensin-converting enzyme (ACE)-inhibiting composition comprising:

- a) preparing an aqueous solution of a whey protein fraction and trypsin;
- b) holding said aqueous solution under conditions effective for reaction to partially hydrolyze said whey protein fraction;
- c) stopping said reaction to provide a hydrolysate solution; and
- d) drying said hydrolysate solution prepared in step c to provide the ACE-inhibiting composition.

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Title: Enzymatic Treatment of Whey Proteins for the Production of Antihypertensive Peptides and the Resulting Products

Page 9

Dkt: 267.011US1

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34. (New) A process for preparing an angiotensin-converting enzyme (ACE)-inhibiting composition comprising:

- a) preparing an aqueous solution of a whey protein isolate and trypsin;
- b) holding said aqueous solution under conditions effective for reaction to partially hydrolyze said whey protein isolate;
- c) stopping said reaction to provide a hydrolysate solution; and
- d) drying said hydrolysate solution prepared in step c to provide the ACE-inhibiting composition.

35. (New) A process according to claim 34, wherein the whey protein isolate has a protein content that varies by 0 to 25% from 97.5%.

36. (New) A process according to claim 34, wherein the whey protein isolate has a protein content of at least 94%.

37. (New) The process according to claim 34, wherein the whey protein isolate contains at least 70% β -lactoglobulin.

38. (New) The process according to claim 37, wherein the whey protein isolate contains at least 80% β -lactoglobulin.

39. (New) The process according to claim 38, wherein the whey protein isolate contains about 91% β -lactoglobulin.